Presentation by Sean Clarke, PhD, RN, FAAN
Professor and Associate Dean, Connell School of Nursing,
Boston College, Chestnut Hill, MA

Registered Nurse Staffing Ratios, Patient Safety and Quality of Care: A Summary of Current Research

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BOSTON COLLEGE

Professional Background

- Trained in nursing outcomes research at the University of Pennsylvania, the home of the leading center in the field run by Dr. Linda Aiken for more than two decades
- Associate Director of the center for 7 years; primary data analyst on the group's most-cited studies
- Specialist in quality/safety issues in hospitals (and staffing in particular); authored/coauthored >130 articles
- 25 years in nursing and a professor/administrator in nursing education for 20 years;17 years in policy research in nursing in U.S. and Canada (Pennsylvania, Massachusetts, Quebec, Ontario)
- Fellow of the American Academy of Nursing and hold adjunct appointments at the Université de Montréal and the University of Hong Kong

When I started in this area I was uncertain about the merits of staffing legislation

15 years later, I have come to understand from a critical reading of research findings and observing the field that:

- Staffing in hospitals is not always adequate for nurses to provide necessary care
- Without regulation, levels in a significant number of hospitals are destined to stray outside acceptable levels
- Staffing-ratio legislation makes sense in light of research data

The "Big Picture"

- While RNs provide the majority of direct (hands-on) care to hospital patients, nursing care is an often invisible part of health care to decision-makers
- Staffing hospitals can be complex; however, there is general consensus about optimal nurse-patient ratios that enable safe care but they are not always followed

Hospital staffing regulations are vague

- "Sufficient" staffing is required for Joint Commission accreditation and participation in Medicare, for example
- "Sufficient" is not defined
- There have also been requirements to measure and track outcomes potentially related to nurse staffing issues that have been vague and weakly enforced

The result: wide variability

- Every hospital can make its own rules about RN staffing, and does not have to report actual staffing numbers
- For example: no law requiring a limit on number of patients a nurse is assigned
- No law limiting number of continuous hours a nurse can be ordered to work
- No law requiring adequate rest in between shifts
- No law limiting untrained nurses from being "floated" to other units
- Without clear, consistent regulations, it is inevitable that some hospitals fall short of optimal staffing

Why is this important?

First and foremost, care **should not cause unnecessary harm**

The human cost of errors and adverse events

Some estimates place preventable incidents in hospitals as the 3rd leading cause of death in America with as many as 440,000 dying each year.

A New, Evidence-based Estimate of Patient Harms Associated with Hospital Care, September 2013 - Volume 9 - Issue 3 - p 122–126

JOURNAL OF PATIENT SAFETY

Snapshot of Michigan

52,000 incidents, near misses and unsafe conditions were reported in Michigan hospitals in 2014, according to MHA

Source: 2015 Michigan Health and Hospital Association Patient Safety and Quality Annual Report

What works?

Research strongly suggests that an adequate number of properly educated health care workers (especially of RNs as primary providers of direct care in hospitals) is the best first line of defense against preventable injuries and deaths

Registered Nurses: Patients' first line of defense

Today, patients are in the hospital to be monitored

- They are in the hospital because they are unstable or are at high risk for becoming clinically unstable or they require treatments that require close monitoring
- They always need a trained person within close reach—otherwise they would be at home
- Complexities of patients and intensity of treatment in hospitals have consistently risen over the past decades, while lengths of stay have dropped

Primary RN responsibilities

- Provide most hands-on care (and all complex direct care) and carry responsibility for care any other nursing personnel provide (e.g., LPNs)
- Often perform complex tasks such as calculating medication doses, mixing/prepping prescribed meds, making minute-to-minute clinical decisions
- Apply judgment to carrying out care plans; for example questioning inappropriate or inaccurate orders
- Educating patients and families regarding their care in the hospital and beyond
- All this requires detailed knowledge about patient conditions and treatments as well as the time to make observations, interpret them, and act on them

What happens when nurses are assigned too many patients

- Some patients go unmonitored for prolonged periods of time
- There can be a delay in detecting problems (making it harder to fix) or they are found too late altogether (permanent disability/death)
- Details can be overlooked – this is very important because nurses catch up to 80% of health care team errors before they harm patients

The research in a nutshell

The overwhelming evidence from the research is that **RN-to-patient ratios** are among the most consistent predictors of the safety and quality of hospital care and one of the few we can control.

Recommended ratios

There are generally held ideas and expert consensus about how many patients a nurse can safely take care of by type/ setting.

Examples:

- Woman in active labor (condition can change from moment to moment, mother and infant safety could require immediate action) **1 patient:1 nurse**
- Medical-surgical unit (frequent medications, treatments to prevent infection, need someone close at hand) one estimate is **4 patients:1 nurse**

A word on research challenges

- Not every study suggests a link between staffing and any particular outcome
- Sometimes effects are small
- It's difficult to reflect what actually happens minute-by-minute in patient care situations where staffing is low
- Can't study staffing experimentally; for example, it would be unethical to give one group of patients good RN staffing and another group poor staffing just to measure outcomes
- Time limitations and disincentives to report can have an effect
- There are limitations in all research examining outcomes in relation to observed differences in variables; however, most findings involve extensive controls for patient and other hospital characteristics

A strong body of research

- Approximately 200 studies have now been published on the connection between nurse staffing and hospital outcomes
  - Different countries, settings, specialties
- The clear takeaway message from these studies: lower RN staffing increases risk for poor patient outcomes in hospitals

Nursing work that goes undone with poor staffing (missed care, care rationing)

A variety of researchers have studied this, mostly using survey data (U/Penn, U/Michigan, U/Montreal, U/Basel, U/Texas)

The bad outcomes associated with missed care include:

- Deaths from treatment delays
- Falls
- Infections
- Complications from staying bedbound (pressure ulcers, blood clots)
- Preventable readmissions
- Missed medications and treatments
- Problems with planning and coordination of care
- Reduced attention to patient comfort
- Omitted patient and family teaching
- Neglected planning and coordination for care at home

6 key RN staffing studies

1. Nurse staffing levels and adverse events following surgery in U.S. hospitals, 1998

- First of the current era
- 600 hospitals in 10 states—examined complications in surgical patients
- Significantly higher rates of urinary tract infections, pneumonias and lung complications in hospitals with lower RN staffing

Kovner C, Gergen PJ., Image: The Journal of Nursing Scholarship (now JNS) 1998;30(4):315-21

NURSING SCHOLARSHIP

Key RN staffing studies

2. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction, 2002

- 232K patients,168 hospitals, 1 state
- Every additional patient on the average bedside nurse's workload in a hospital was associated with a 7% increase in risk of death within 30 days after common surgeries
- Later studies added other variables (like BSN education) as predictors—staffing ratio effects always persist

Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. JAMA. 2002 Oct 23-30;288(16):1987-93

JAMA The Journal of the American Medical Association

Key RN staffing studies

3. Nurse-staffing levels and the quality of care in hospitals, 2002

- 6M patients, ~800 hospitals, 13 states
- 14 adverse outcomes (including complications like infections and deaths) in adult hospital patients increased by up to 12% in the lowest staffed hospitals

Needleman J, Buerhaus P, Mattke S, Stewart M, Zelevinsky K. N Engl J Med. 2002 May 30;346(22):1715-22

The NEW ENGLAND JOURNAL of MEDICINE

Key RN staffing studies

4. Nursing staffing and quality of patient care, 2007

- 94 studies examining associations of nurse-to-patient ratios and hours per patient day on patient outcomes in hospital practice from the United States and Canada, 1990-2006
- Formal meta-analysis (statistical crunching down of results across studies) taking study quality into consideration

Kane, et al; AHRQ Publication No. 07-E005 March 2007

AHRQ Agency for Healthcare Research and Quality

Key RN staffing studies

(Kane, et al, continued)

Outcomes associated with RN-to-patient ratios and hours per patient care

- Patient mortality
- Hospital-acquired infections
- Failure to rescue (death in surgical patients who experience complications)
- Respiratory complications
- Extended length of stay

Key RN staffing studies

5. Nurse staffing and inpatient hospital mortality, 2011

- Addressed the issue that staffing actually experienced by patients had rarely been studied
- A study of 197,961 patients who received care in one or more of 43 units in a nationally recognized hospital
- Unit and shift staffing data for each shift for the years 2003 to 2006 were merged with patient data: 3.2 million 'unit-shifts' for those patient

Needleman J, Buerhaus P, Pankratz VS, Leibson CL, Stevens SR, Harris M. N Engl J Med. 2011 Mar 17;364(11):1037-45.

The NEW ENGLAND JOURNAL of MEDICINE

(continued)

Findings: Every shift that a patient was on a unit that was understaffed or had high patient turnover was associated with significantly higher death risk patients for the sickest patients (who spent time in the ICU) and for patients in general

The largest-scale study to date

6. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study, 2014

- 423K patients, 300 hospitals, 9 countries
- An increase in average nurses' workload by one patient in a hospital increased the likelihood of a surgical inpatient dying by 7% within 30 days of admission (same statistical effect later found in multiple states and countries)

Aiken, et al for the RN4CAST consortium: Lancet. 2014 May 4; 383 (9931): 1824-30

THE LANCET

Some of the newest studies

People who have a cardiac arrest while hospitalized are 5 percent less likely to survive for each additional patient assigned to nurses in their hospital on average.

Medical Care, January 2016

MEDICAL CARE

Other recent findings

ICU patients are 3.5 times more likely to die when the nurse-patient ratio is higher than 1 to 2.5.

Critical Care Medicine, August 2015

Critical Care Medicine

Other recent findings

Hospitals with better nurse staffing levels had 25 percent lower odds of being penalized for preventable readmissions.

Health Affairs, October 2013

HealthAffairs

Other recent findings

Death rates are 60 percent lower for patients with aortic abdominal aneurysm in hospitals with better nurse-to-patient ratios.

Health Services Research, June 2013

HSR

Other recent findings

Likelihood of readmission for children within 30 days of surgery is 48 percent higher when just one child is added to the staffing ratio.

BMJ Quality & Safety in Health Care, May 2013

BMJ Quality & Safety

The upshot

- Results are clear and compelling regarding increased risks for patients at lower RN staffing levels
- The durability of results despite the challenges in this field suggests that the actual effects may be even stronger than documented, especially with vulnerable patients

3 legislative approaches to regulating RN hospital staffing

- **Mandated staffing ratios:** CA (+ Australian state of Victoria), MA (for ICUs)
- **Mandated reporting to regulators and/or public reporting (5 states):** IL, NJ, NY, RI, VT
- **Mandated staffing committees (7 states):** CT, IL, NV, OH, OR, TX, WA (MN has CNO submit staffing plan with state input)

+ more than a decade of activity in a number of other states and repeated introduction of legislative proposals at the federal level

States that have adopted/enacted staffing regulations

www.nursingworld.org; updated 12/2015

Conclusion

Because adequate RN staffing coverage is a bedrock of hospital safety, I have come to believe that laws establishing reasonable mandatory minimum RN-to-patient ratios are the most effective intervention to protect patients in hospitals.